Federal Emergency Management Agency Environmental Assessment

Passaic Valley Sewerage Commission Floodwall and On-Site Power System

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APPENDIX A: MAPS AND FIGURES

FIGURE 1: KEY PLAN FOR PASSAIC VALLEY SEWERAGE COMMISSION PROPOSED FLOODWALL & ON-SITE STANDBY POWER SYSTEM

This plan depicts the key plan for the Subgrantee's Proposed Floodwall and On-Site Standby Power System dated September 9, 2013, was prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 2: PARCEL PLAN, WEST OF DOREMUS AVENUE (WEST PLAN)

This plan depicts the parcel plan for the west side of Doremus Avenue dated September 9, 2013, was prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 3: PARCEL PLAN, EAST SIDE OF DOREMUS AVENUE (EAST PLAN)

This plan depicts the parcel plan for the east side of Doremus Avenue dated September 9, 2013, was prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 4: FLOODWALL, STORM DRAINAGE AND ON-SITE STANDBY POWER SYSTEM WEST PLAN IMPROVEMENTS

This plan depicts the floodwall, storm drainage and on-site standby power system improvements proposed for the facility on the western side of Doremus Avenue, dated September 9, 2013, was prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 5: FLOODWALL, STORM DRAINAGE AND ON-SITE STANDBY POWER SYSTEM EAST PLAN IMPROVEMENTS

This plan depicts the floodwall, storm drainage and on-site standby power system improvements proposed for the facility on the eastern side of Doremus Avenue, dated September 9, 2013, was prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 6: STRUCTURAL DETAILS OF FLOODWALLS

These drawings and specifications depict the structural details of the three types of floodwalls the applicant has proposed to install at the facility, dated September 9, 2013, were prepared by PS&S and signed by Glenn P. Kustera, professional engineer.

FIGURE 7: PLAN AND PROFILE DRAINAGE IMPROVEMENT (EASTERN SIDE) (EAST PLAN)

These drawings depict the plan and profile for the drainage improvements proposed for the facility on the eastern side of Doremus Avenue, dated September 9, 2013, were prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 8: PLAN AND PROFILE DRAINAGE IMPROVEMENT (WESTERN SIDE) SHEET 1 (WEST PLAN)

These drawings depict the plan and profile for the drainage improvements proposed for the facility on the western side of Doremus Avenue, dated September 9, 2013, were prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 9: PLAN AND PROFILE DRAINAGE IMPROVEMENT (WESTERN SIDE) SHEET 2 (WEST PLAN)

These drawings depict the plan and profiles for the drainage improvements proposed for the facility on the western side of Doremus Avenue, dated September 9, 2013, were prepared by PS&S and signed by James R. Wancho, professional engineer.

FIGURE 10: SITE LOCATION MAP

This map depicts the boundaries of the facility as an overlay on the Esri ArcGIS Online, World Topo Map layer, 2013, and shows the facility in the context of major roadways. Map prepared by PS&S.

FIGURE 11: AERIAL IMAGERY MAP

This map depicts the boundaries of the facility property on a 2012 aerial photograph of the site, and at a scale of one inch equals 400 feet, shows buildings and sewerage treatment facilities on site, and surrounding industrial uses. Map prepared by PS&S.

FIGURE 12: STREET MAP

This map depicts the boundaries of the facility on an overlay on the Esri ArcGIS Online, World Street Map, 2013, and shows the site in the context of major roads and smaller streets in the area. Map prepared by PS&S.

FIGURE 13: SEWERAGE DISTRICT MAP

This map shows the Service District which encompasses approximately 155 square miles and includes 48 municipalities in parts of Bergen, Essex, Hudson, Passaic and Union Counties. Map prepared by PS&S.

FIGURE 14: SSURGO SOILS MAP

This map depicts the boundaries of the facility on an overlay of the NCRS, USDA database, showing that the site is underlain almost entirely by urban land soil types. Map prepared by PS&S.

FIGURE 15: NORTHERN NEW JERSEY MEAN ANNUAL TEMPERATURE (1895-2012)

This figure shows how mean annual temperatures have increased, from the 1895 through 1970 mean of 50.6 degrees Fahrenheit and a 1971 through 2000 mean of 50.9 degrees, to a 2001 through 2012 mean of 53 degrees, and an overall upward temperature trend of 1.8 degrees Fahrenheit per century from 1895 through 2012. Figure prepared by PS&S.

FIGURE 16: NORTHERN NEW JERSEY ANNUAL PRECIPITATION (1895-2012)

This figure shows how annual precipitation levels have increased, from the 1895 through 1970 mean of 44.57 inches, to a 1971 through 2000 mean of 49.79 inches, to a 2001 through 2012 mean of 52.36 inches. Figure prepared by PS&S.

FIGURE 17: SURFACE WATERS AND RIPARIAN ZONES MAP

This map depicts the boundaries of the facility on an aerial photograph and shows riparian zones along the facility's waterfront at Newark Bay and surface water and riparian zones along the on-site portion of Jasper Creek. Map prepared by PS&S.

FIGURE 18: WETLANDS DELINEATION AND STATE OPEN WATERS MAP

This map depicts the boundaries of the facility on an aerial photograph and shows regulated wetlands along Jasper Creek and a concrete lined tidal creek at the site's waterfront along Newark Bay. Map prepared by PS&S.

FIGURE 19: FEMA PRELIMINARY WORK MAP

This map depicts the boundaries of the facility on FEMA's current preliminary work map, showing that the majority of the site is below the FEMA 100 year flood plain, elevation 11, 1988 Datum. Map prepared by PS&S.

FIGURE 20: LANDSCAPE PROJECT MAP

This map depicts the boundaries of the facility on an aerial photograph and shows an overlay of the NJDEP's threatened and endangered species database information. The map shows potential habitat for two bird species of concern: black-crowned night heron and cattle egret. Map prepared by PS&S.

FIGURE 21: CENSUS TRACT ANALYSIS MAP

This map summaries census tract data in the area of the facility, showing two census tracts which together encompass 9.3 square miles. The southern census tract has a population of 1,173 and 4 total households, and the northern census tract has a population of 5,143 and 930 total households. Map prepared by PS&S.

FIGURE 22: PREDOMINANT RACE POPULATIONS MAP

This map summarizes racial and ethnic diversity in the area of the facility. The Diversity Index shows the likelihood that two persons chosen at random from the same area belong to different race or ethnic groups. The map shows race data as follows for the site: white at 16.5 to 31.6 percent; black at 34.1 to 68.2 percent; Hispanic at 14.5 to 26.8 percent and other at 0.2 to 4 percent. Map prepared by PS&S.

FIGURE 23: DIVERSITY INDEX MAP

This map summarizes racial and ethnic diversity in the area of the facility. The Diversity Index shows the likelihood that two persons chosen at random from the same area belong to different race or ethnic groups. The site is mapped as having a diversity index of 56 to 81, with the US Index being 61. Map prepared by PS&S.

FIGURE 24: MEDIAN HOUSEHOLD INCOME MAP

This map summarizes median household income in the area of the facility. The map shows no households at or in the immediate vicinity of the site. Map prepared by PS&S.

FIGURE 25: MEDIAN HOME VALUE MAP

This map summarizes median home values in the area of the facility. The map shows no homes at or in the immediate vicinity of the facility. Map prepared by PS&S.

FIGURE 26: AVERAGE HOUSEHOLD SIZE MAP

This map summarizes average house size in the area of the facility. The map shows household size may range from as few as two people to 3.5 or more. Map prepared by PS&S.

FIGURE 27: MEDIAN AGE MAP

This map summarizes average median age in the area of the facility. The map shows the median age at and in the immediate vicinity of the site to be between 27.1 and 43 years old. Map prepared by PS&S.

FIGURE 28: NOISE MONITORING LOCATIONS MAP

This figure shows the five noise monitoring locations which were located surrounding the on-site standby power system. Map prepared by PS&S.

FIGURE 29: CONSTRUCTION NOISE DISTANCE CONTOURS MAP

This figure shows noise distance contours at 100 to 1500 feet from the construction site boundary, corresponding to the distances assessed for construction noise impacts. Figure prepared by PS&S.

FIGURE 30: NOISE MODELING RESULTS – PROPOSED ON-SITE STANDBY POWER SYSTEM

This figure presents the modeled sound level impacts from the on-site standby power system at seven nearby property boundary receptors. The modeling results indicate that the projected sound-level contributions from the on-site standby power system at all nearby commercial and industrial property lines to the Site will be in compliance with the applicable State of New Jersey and City of Newark sound-level performance standards. Figure prepared by PS&S.

FIGURE 31: CONTAMINATION AND REMEDIATION AREAS MAP

This map depicts known contaminated sites, groundwater classification exception areas, deed notice areas and NJPDES surface water discharge pipes mapped by the NJDEP on and in the vicinity of the facility. Map prepared by PS&S.

FIGURE 32: PROPOSED DIESEL GENERATOR LOCATIONS

This map depicts the overall proposed project plan showing the proposed diesel generator locations. Plan prepared PS&S.

APPENDIX B: REPORT TABLES

TABLE 1: FEMA PROJECT WORKSHEETS RELATED TO HURRICANE SANDY DAMAGE TO THE FACILITY

This table lists emergency and permanent repairs completed on critical components at the facility and funded by FEMA. Also listed are repair estimates for the individual repairs.

TABLE 2: SUMMARY OF ALTERNATIVES

This table is a summary of the merits of the five assessed alternatives including: no action; component floodproofing and on-site standby power system; elevate the entire site above the floodplain; relocate the facility outside the floodplain and the Proposed Alternative, to construct the floodwall with an onsite standby power system.

TABLE 3: SUMMARY OF POTENTIAL IMPACTS TO AFFECTED ENVIRONMENT

This table lists the resources and summarizes the information and findings of potential environmental impact for three of the assessed alternatives (i.e., no action; the Proposed Alternative; and component floodproofing/on-site standby power system).

TABLE 4: NATIONAL AND NEW JERSEY AMBIENT AIR QUALITY STANDARDS

This table provides a list of the current National and New Jersey Ambient Air Quality Standards that are applicable to the project site.

TABLE 5: BACKGROUND AMBIENT AIR QUALITY DATA

This table shows the maximum monitored levels of PM10, PM2.5, SO2, NO2, ozone and CO monitored during 2010, 2011 and 2012 at representative NJDEP monitoring locations. The concentrations of these air contaminants measured at these locations were below all of the applicable National and New Jersey Ambient Air Quality Standards, except for ozone.

TABLE 6: COMPONENT FLOODPROOFING/ON-SITE STANDBY POWER SYSTEM – WORST-CASE ANNUAL EMMISSIONS FROM DIESEL STANDBY GENERATORS

This table shows the projected emissions of SO2, GHG, NOx, CO, VOC and particulate matter from 32 diesel standby generators under the component floodproofing/on-site standby power system alternative. The table shows that annual NOx emissions from the diesel standby generators without add-on controls would exceed the applicable major modification thresholds.

TABLE 7: PROPOSED ALTERNATIVE – STATIONARY SOURCE EMISSIONS - STANDBY SOLAR TITAN 250 TURBINE GENERATORS FIRING NATURAL GAS

This table provides a list of the projected emission factors and projected annual emissions of NOx, CO, So2, VOC, particulate matter, ammonia and GHG from the proposed on-site standby power system, including the gas turbine generators and black start engine. The proposed emissions of these contaminants are below applicable Significant Net Emissions Increase/ Permit Applicability Thresholds.

TABLE 8: PROPOSED ALTERNATIVE – NET AIR QUALITY BENEFIT – COMPARISON OF EMISSIONS FROM PROPOSED ON-SITE STANDBY POWER SYSTEM WITH UTILITY GRID EMISSIONS

This table provides a comparison of the projected emissions of NOx, SO2 and CO2 from the proposed on-site standby power system with utility grid emissions on a pounds per megawatt-hour basis and in tons per year, showing that emissions from the Proposed Alternative are projected to be significantly lower than the corresponding average emissions from the utility grid, and that a net air quality benefit is projected from implementation of the on-site standby power system based on the premise that electrical power generated by the on-site standby power system will replace power that would otherwise be purchased from the electric utility grid.

TABLE 9: PROPOSED ALTERNATIVE – PROJECTED HAZARDOUS AIR POLLUTANT (HAP) EMISSIONS – TWO STANDBY SOLAR TITAN 250 TURBINE GENERATORS FIRING NATURAL GAS WITH SCR AND OXIDATION CATALYST

This table provides a list of the projected annual emissions of HAPs from the proposed on-site standby power system with two standby Solar Titan 250 Turbine Generators firing natural gas with SCR and oxidation catalyst, based on USEPA emission factors. This table shows that controlled HAP emissions are less than the NJDEP de minimis reporting thresholds.

TABLE 10: PROPOSED ALTERNATIVE – RISK SCREENING WORKSHEET

This table provides a risk screening analysis using the NJDEP Risk Screening Worksheet, and presents the projected long-term and short-term ambient air quality impacts for HAPs from the proposed natural gas turbine generators. The results of the analysis shows that the total incremental risk is well below the NJDEP risk screening criterion of 1.5 in 1 million, and both the total long-term hazard index and the total short-term hazard index are less than one, and therefore considered to be negligible, indicating that HAP emissions from the Proposed Alternative will not cause significant risks to human health.

TABLE 11: PROPOSED ALTERNATIVE - GENERAL CONFORMITY APPLICABILITY ASSESSMENT – ESTIMATED PEAK YEAR ANNUAL EXHAUST AND CRANKCASE EMISSIONS FROM NONROAD CONSTRUCTION EQUIPMENT

This table shows the maximum projected annual emissions of NOx, CO, VOC and particulate matter from nonroad construction equipment. The table shows that the projected NOx emissions of 39.89 tons per year are below the General Conformity De Minimis Emission Threshold of 100 tons per year, and that the projected annual emissions of CO, VOC and particulate matter are well below the applicable General Conformity De Minimis Emission Thresholds.

TABLE 12: PREVIOUSLY IDENTIFIED CULTURAL RESOURCES WITHIN ONE-HALF MILE OF THE PROJECT SITE

This table lists four historic properties previously found eligible for listing in the NHRP and State Register, including the Historic District, located on or within one-half mile of the facility. Three of the four sites are designated historic railroad districts.

TABLE 13: EXTANT BUILDINGS AND STRUCTURES OVER 50 YEARS OF AGE ASSOCIATED WITH THE PASSAIC VALLEY SEWERAGE COMMISSION NEWARK BAY OUTFALL SEWERAGE WORKS HISTORIC DISTRICT

This table lists extant buildings and structures over 50 years of age that are associated with the Historic District. Included are construction dates, disposition and contributing vs. non-contributing status.

TABLE 14: NOISE MONITORING RESULTS

This table lists the sound levels (Leq, L90 and Lmin) measured on July 18, 2013 at five monitoring locations, and provides comparisons of the monitored levels to the applicable New Jersey State Noise Code and City of Newark Sound Level Standards.

TABLE 15: ESTIMATED OUTDOOR CONSTRUCTION NOISE LEVELS (dBA)

This table lists the estimated noise levels from various phases of construction at distances of 100 to 1500 feet from the construction site boundary.

TABLE 16: DIFFERENCE IN SOUND LEVELS DUE TO OUTDOOR CONSTRUCTION NOISE LEVELS (dBA)

This table lists the estimated maximum increase in sound level over existing background levels from various phases of construction at distances of 100 to 1500 feet from the construction site boundary.

TABLE 17: PROPOSED ALTERNATIVE - SOUND MODEL INPUTS – 2 SOLAR TITAN 250 TURBINE GENERATORS IN OPERATION (1 TURBINE STANDBY)

This table lists selected input data for the sound modeling of the proposed on-site standby power system, including equipment sound pressure level specifications, sound source heights, and the heights of the turbine building and the floodwalls.

TABLE 18: PROPOSED ALTERNATIVE - MODELED NOISE IMPACTS – TWO SOLAR TITAN 250 TURBINE GENERATORS OPERATING

This table presents a summary of the modeled sound level impacts from the two Solar Titan 250 Turbine Generators to be operating at the proposed on-site standby power system at the seven nearby property boundary receptors. The modeling results indicate that the projected sound-level contributions from the planned on-site standby power system at all nearby commercial and industrial property lines to the project site will be in compliance with the applicable State of New Jersey and City of Newark sound-level performance standards. The maximum sound level increase in Leq is projected to be 1.2 dBA (unnoticeable).

APPENDIX C: EO 11988-11900 FLOODPLAIN MANAGEMENT AND WETLANDS

Appendix C has four items total, including one 8-Step Summary, one Preliminary Work Map, one Wetlands Delineation and State Open Waters Map, and one letter describing a hydrology study.

DOCUMENT 1: EIGHT STEP DECISION MAKING PROCESS

In compliance with FEMA regulations, 44 CFR Part 9, implementing Executive Order (EO) 11988 Floodplain Management and EO 11990 Wetlands Protection an eight-step decision-making process is used for actions that are proposed in floodplains and wetlands.

DOCUMENT 2: PRELIMINARY WORK MAP

This map depicts the boundaries of the facility on the FEMA's current preliminary work map, showing that the majority of the site is below the FEMA 100 year flood plain, elevation 11, 1988 Datum. Map prepared by PS&S.

DOCUMENT 3: WETLANDS DELINEATION AND STATE OPEN WATERS MAP

This map depicts the boundaries of the facility on an aerial photograph and shows regulated wetlands along Jasper Creek and a concrete lined tidal creek at the site's waterfront along Newark Bay. Map prepared by PS&S.

DOCUMENT 4: HYDROLOGY STUDY LETTER

This is a letter from PS&S to FEMA regarding the methodology utilized to evaluate hydrologic impacts of the proposed flood wall at the Passaic Valley Sewerage Commission facility on the surrounding floodplain elevations.

DOCUMENT 5: NJDEP LETTER OF INTERPRETATION

This letter from NJDEP to the Subgrantee is a response to the Subgrantee's request to have the Division of Land Use Regulation verify the boundary of freshwater wetlands, transition areas and/or State open waters on facility property.

APPENDIX D: COASTAL ZONE CONSISTENCY AND PERMIT CORRESPONDENCE

Appendix D includes four items total, including two letters and two checklists.

DOCUMENT 1: FEDERAL CONSISTENCY DETERMINATION SUBMITTAL TO NJDEP

The letter is from FEMA to NJDEP requesting concurrence with FEMA's Federal Consistency determination statement for the proposed action, dated September 10, 2013.

DOCUMENT 2: FEDERAL CONSISTENCY CHECKLIST

The checklist is the Federal Consistency Determination checklist from FEMA and the Subgrantee to NJDEP.

DOCUMENT 3: FEDERAL CONSISTENCY APPROVAL LETTER

The second letter is from the NJDEP to the Subgrantee stating that the Proposed Alternative is consistent with the approved New Jersey Coastal Management Program.

DOCUMENT 4: NJDEP PERMIT READINESS CHECKLIST

The second checklist is a Permit Readiness Checklist Form from PS&S to the NJDEP. This form assists the Department in determining what permits might be needed to authorize a project and to ensure that all appropriate programs attend a pre-application meeting.

APPENDIX E: CULTURAL RESOURCES

Appendix E includes twelve items, ten letters of correspondence and two documents related to the historic preservation review of the Proposed Alternative at the facility.

DOCUMENT 1: PS&S-PUBLIC PARTICIPATION MEMO

The Public Participation Memo is the document provided by PS&S to consulting parties notifying said parties of the Proposed Alternative to be completed at the facility. The Memo summarizes the history of the facility, the Proposed Alternative, the facility's and nearby historic resources, the potential adverse effects, and mitigation measures the Subgrantee has proposed to mitigate adverse effects to identified historic properties.

DOCUMENT 2: MAP OF PREVIOUSLY IDENTIFIED CULTURAL RESOURCES WITHIN ½ MILE OF THE PROJECT AREA

A map showing all previously identified cultural resources within ½ mile of the project site. Map prepared by PS&S.

DOCUMENT 3: PS&S SUMMARY LETTER- PUBLIC PARTICIPATION PROCESS- TO THE NJSHPO

This letter dated January 23, 2014, summarizes the public participation process undertaken by PS&S. The letter recaps FEMA's Tribal Consultations, the interested party consultations undertaken by PS&S, and details of the Subgrantee's Public Meeting held on December 19, 2013.

DOCUMENT 4: FEMA CONSULTATION LETTER TO THE NJSHPO

Letter dated December 20, 2013. This letter serves as a cover letter for submission of the Phase IA, Cultural Resource Reconnaissance for the Passaic Valley Sewerage Commission Newark Bay Outfall Sewerage Works (Phase IA) prepared by PS&S dated December 6, 2013. The letter informs the NJSHPO of: the re-evaluation of the existing Historic District; the Subgrantee's Proposed Alternative; adverse effects; proposed mitigation measures; FEMA's conditional finding of No Adverse Effect To Historic Properties; and request for NJSHPO's concurrence with this finding within 15 days of receipt.

DOCUMENT 5: FEMA REVISED CONSULTATION LETTER TO THE NJSHPO

This letter dated January 14, 2014, revised FEMA's finding to that of an Adverse Effect to Historic Properties; stating the adverse effect would be mitigated through archaeological monitoring of the partial demolition of the Unit 2 Sedimentation

Basins and the Historic Main Conduits to include written and digital photographic documentation prior to construction.

DOCUMENT 6: NJSHPO OPINION LETTER

Letter dated January 30, 2014. NJSHPO finds that the proposed project will have an adverse effect on historic properties and that FEMA has proposed to mitigate this effect with Treatment Mitigation Measure G from the Programmatic Agreement. NJSHPO also provides an updated NJSHPO opinion for the Historic District.

DOCUMENT 7: LIST OF TRIBAL CONSULTATION LETTERS: CONTACT / DELIVERY / RESPONSE

The list of Tribes FEMA sent Tribal Consultation Letters to, the point of contact for each Tribe, the date each letter was delivered, and a response date if one was received from the addressee.

DOCUMENT 8: FEMA TRIBAL CONSULTATION LETTER TO THE DELAWARE NATION

Letter dated December 17, 2013, providing the Delaware Nation with a copy of the Phase IA prepared by PS&S dated December 6, 2013. The letter requests the Tribe notify FEMA if they are aware of any significant prehistoric/historic archaeological resources which are within the project site or may be affected by the project, if there are any additional resources which should be looked at, and if there are any other parties that should be consulted, within 30 days of receipt.

DOCUMENT 9: FEMA TRIBAL CONSULTATION LETTER TO THE DELAWARE TRIBE OF INDIANS' CHIEF

Letter dated December 19, 2013, providing the Delaware Tribe of Indians' Chief with a copy of the Phase IA prepared by PS&S dated December 6, 2013. The

letter requests the Chief notify FEMA if she is aware of any significant prehistoric/historic archaeological resources which are within the project site or may be affected by the project, if there are any additional resources which should be looked at, and if there are any other parties that should be consulted, within 30 days of receipt.

DOCUMENT 10: FEMA TRIBAL CONSULTATION LETTER TO THE DELAWARE TRIBE OF INDIANS

Letter dated December 17, 2013, providing the Delaware Tribe of Indians with a copy of the Phase IA prepared by PS&S dated December 6, 2013. The letter requests the Tribe notify FEMA if they are aware of any significant prehistoric/historic archaeological resources which are within the project area or may be affected by the project, if there are any additional resources which should be looked at, and if there are any other parties that should be consulted, within 30 days of receipt.

DOCUMENT 11: FEMA TRIBAL CONSULTATION LETTER TO THE SHAWNEE TRIBE OF OKLAHOMA

This letter dated December 17, 2013, providing the Shawnee Tribe of Oklahoma with a copy of the Phase IA prepared by PS&S dated December 6, 2013. The letter requests the Tribe notify FEMA if they are aware of any significant prehistoric/historic archaeological resources which are within the project area or may be affected by the project, if there are any additional resources which should be looked at, and if there are any other parties that should be consulted, within 30 days of receipt.

DOCUMENT 12: TRIBAL RESPONSE LETTER DELAWARE TRIBE OF INDIANS TO FEMA

This letter dated January 28, 2014, acknowledges receipt of the survey report, no objection to the Proposed Alternative, and defers future comment to FEMA,

NJSHPO and/or the State Archaeologist. The Tribe also asks to be notified if human remains are accidentally unearthed during the project.

APPENDIX F: BORING LOGS

In 1978, prior to the late 1970s/early 1980s expansion of the facility, geotechnical borings were conducted on a 100-foot-interval grid across the entire property. Of a potential 817 borings, 357 were completed. Historic boring samples from the early- to mid-twentieth century were also included and referenced as a part of this 1970s study.

FIGURE 1: BORING LOCATION PLANS (EAST SIDE)

This map depicts the geotechnical boring location grid plan for the portion of the facility that lies to the east of Doremus Avenue. The horizontal and vertical axes indicate the boring sample number in the boring logs (Figures 3.1 – 3.27). As indicated by the legend, each boring sample was acquired with the use of a mechanized hammer with either a 24 inch or 30 inch drop. Warren George Inc. of Jersey City New Jersey was the Boring Contractor used. This Boring Location Plan dated November 1976 was approved by Charles A. Manganaro, professional Engineer, New Jersey License number 6796.

FIGURE 2: BORING LOCATION PLANS (WEST SIDE)

This map depicts the geotechnical boring location grid plan for the portion of the facility that lies to the west of Doremus Avenue. The horizontal and vertical axes indicate the boring sample number in the boring logs (Figures 3.1 – 3.27). Warren George Inc. of Jersey City New Jersey was the Boring Contractor used. This Boring Location Plan dated November 1976 was approved by Charles A. Manganaro, professional Engineer, New Jersey License number 6796.

FIGURES 3.1 – 3.27: BORING LOGS

Each log depicts the soil profile showing composition and depth of various horizons for each of the individual boring samples identified in the boring location plans (Figures 1 and 2). The soil boring data indicates that the majority of the samples showed fill deposits which were used to build up the low lying area during the twentieth century. These logs also indicate natural marshland deposits which exist below the fill layers. Warren George Inc. of Jersey City New Jersey was the Boring Contractor used. This Boring Location Plan dated November 1976 was approved by Charles A. Manganaro, professional Engineer, New Jersey License number 6796.

FIGURE 4: BORING LOCATION PLANS AND BORING LOGS

This figure depicts the geotechnical boring location grid plan for individual boring samples taken at a secondary facility at the Newark Pumping Station facility. Each log depicts the soil profile showing composition and depth of the various horizons for each of the individual boring samples identified in the boring location plan. As indicated by the legend, each boring sample was acquired with the use of a mechanized hammer with either a 24 inch or 30 inch drop. Warren George Inc. of Jersey City New Jersey was the Boring Contractor used. This Boring Location Plan dated November 1976 was approved by Charles A. Manganaro, professional Engineer, New Jersey License number 6796.

FIGURE 5: BORING LOCATION PLAN

Map depicts the geotechnical boring location grid plan for individual boring samples taken at a two locations at the facility, the first located to the east of the New Jersey Turnpike at the northwest corner of Delancy and Curry streets and the second at the southeast corner of Doremus and Wilson avenues. The horizontal and vertical axes indicate the boring sample number in the boring logs (Figures 6.1 – 6.5). This plan was prepared on March 12th 1975 by Emilus and Associates, Professional Survey Consultants, Oak Ridge Road, Oak Ridge, New Jersey 07436. This Boring Location Plan dated November 1976 was approved by Charles A. Manganaro, professional Engineer, New Jersey License number 6796.

FIGURE 6.1 – 6.5: BORING LOGS (SOIL PROFILES)

Boring logs which list the soil profiles showing composition and the depths of various horizons for each of the individual boring samples previously identified in the boring location plans (Figure 5). These Boring Log profiles were approved by Charles A. Manganaro, professional Engineer, New Jersey License number 6796 on dated November 1976.

FIGURES 7.1 – 7.6: BORING LOGS LOCATION MAPS

Map indicating the location of the boring samples previously taken at the facility, from 1914 to 1936.). These Boring Log sample locations and profiles were approved by Charles A. Manganaro, professional Engineer, New Jersey License number 6796 on dated November 1976.

If you require additional information regarding any of the listed documentation, please Email: FEMA4086Comment@fema.dhs.gov or mail FEMA, Office of Environmental Planning and Historic Preservation, 307 Middletown Lincroft Road, Lincroft, NJ 07738.